

ITINERARIO INTERNAZIONALE E78

S.G.C. GROSSETO - FANO

Adeguamento a 4 Corsie nel Tratto Grosseto - Siena
(S.S. 223 "DI PAGANICO") dal Km 27+200 al Km 30+038 - Lotto 4

MONITORAGGIO AMBIENTALE

COD. **FI13**

IL SOGGETTO ESECUTORE DELLE ATTIVITÀ DI MONITORAGGIO AMBIENTALE ANTE OPERA



IL RESPONSABILE U.O. AMBIENTE, TERRITORIO, ARCHITETTURA E ARCHEOLOGIA :

Arch. Giovanni MAGARÒ

VISTO: IL RESPONSABILE DEL PROCEDIMENTO:

Ing. Achille Devitofranceschi

PIANO DI MONITORAGGIO AMBIENTALE

ATMOSFERA

Certificati di calibrazione della strumentazione n° 2

CODICE PROGETTO			NOME FILE			REVISIONE	SCALA:
PROGETTO	LIV. PROG.	N. PROG.	T01-M003-MOA-RE06_A				
L O 7 0 2 B	E	1 7 0 1	CODICE ELAB.	T 0 1 M 0 0 3 M O A R E 0 6	A	-	
C							
B							
A	Emissione		<i>Giu 2019</i>	-	-	-	
REV.	DESCRIZIONE		DATA	REDATTO	VERIFICATO	APPROVATO	

CERTIFICATE

of Product Conformity (QAL1)

Certificate No. : 0000050626

Certified AMS: CO 12e for CO

Manufacturer: Environnement S.A.
111, bd Robespierre
78304 Poissy cedex
France

Test Institute: TÜV Rheinland Energy GmbH

**This is to certify that the AMS has been tested and certified
according to the standards**

**VDI 4202-1 (2010), VDI 4203-3 (2010), EN 14626 (2012),
EN 15267-1 (2009) and EN 15267-2 (2009)**

Certification is awarded in respect of the conditions stated in this certificate
(this certificate contains 9 pages).

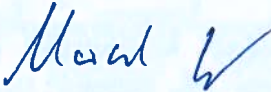


Suitability Tested
Complying with
2008/50/EC
EN 15267
Regular
Surveillance

www.tuv.com
ID 0000050626


Publication in the German Federal Gazette
(BAnz.) of 14 March 2016

German Federal Environment Agency
Dessau, 25 April 2016


Dr. Marcel Langner
Head of Section II 4.1

This certificate will expire on:
13 March 2021

TÜV Rheinland Energy GmbH
Cologne, 24 April 2016


ppa. Dr. Peter Wilbring

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TÜV Rheinland Energy GmbH
Am Grauen Stein
51105 Cologne

Test institute accredited to EN ISO/IEC 17025:2005 by DAkkS (German Accreditation Body).
This accreditation is limited to the accreditation scope defined in the enclosure to the certificate D-PL-11120-02-00

Certificate:
0000050626 / 25 April 2016

Test report: 936/21228317/A of 9 October 2015
Initial certification: 14 March 2016
Date of expiry: 13 March 2021
Publication: BAnz AT 14.03.2016 B7, chapter III number 1.1

Approved application

The certified AMS is suitable for continuous ambient air monitoring (stationary operation).

The suitability of the AMS for this application was assessed on the basis of a laboratory test and a three month field test.

The AMS is approved for a temperature range of 0° C to 30° C.

The notification of suitability of the AMS, performance testing, and the uncertainty calculation have been effected on the basis of the regulations valid at the time of performance testing. As changes in legal regulations are possible, any potential user should ensure that this AMS is suitable for monitoring the limit value relevant to the application.

Any potential user should ensure, in consultation with the manufacturer, that this AMS is suitable for ambient air applications at which it will be installed.

Basis of the certification

This certification is based on:

- test report 936/21228317/A of 9 October 2015 of TÜV Rheinland Energie und Umwelt GmbH
- suitability announced by the German Federal Environment Agency (UBA) as the relevant body
- the on-going surveillance of the product and the manufacturing process

Publication in the German Federal Gazette: BAnz AT 14.03.2016 B7, chapter III number 1.1,
Announcement by UBA from 18 February 2016:

AMS designation:

CO 12e for CO

Manufacturer:

Environnement S.A., Poissy, France

Field of application:

For continuous ambient air monitoring of concentrations of carbon monoxide
(stationary operation).

Measuring ranges during the performance test:

Component	Certification range	Unit
carbon monoxide	0 - 100	mg/m ³

Software version:

Firmware: 1.0.d

Restrictions:

None

Notes:

1. Performance testing also covers version CO 12e* (without display) of the instrument. Measured values are displayed on a PC or laptop belonging to the AMS in this case.
2. The test report on performance test is online available at www.qal1.de.

Test report:

TÜV Rheinland Energie und Umwelt GmbH, Cologne
Report No.: 936/21228317/A dated 9 October 2015

Certified product

This certificate applies to automated measurement systems confirming to the following description:

CO 12e is a continuous carbon monoxide analyser. The measuring principle is based on non-dispersive infrared spectroscopy. The AMS is designed for continuous measurement of carbon monoxide in ambient air.

CO 12e uses the method of infrared absorption according to the Beer-Lambert Law.

The AMS is available in two versions:

- The version **CO 12e** is fitted with a TFT LCD coloured display with backlight and a touch screen function. Signal output as well as operation can also be carried out via the web browser using an external PC connected via Ethernet.
- The version **CO 12e*** is not fitted with a display. Signal output as well as operation can only be operated via the web browser on an external PC connected via Ethernet.

Additional the AMS front side is fitted with the main switch.

Apart from that, both versions of the AMS are of identical design.

Fluid inputs and outputs as well as electrical connections are located on the rear side of the AMS.

The analyser's inside can be roughly divided in two components:

The **mechanical** component consists of an electro valve filter unit as well as the measuring cell. The sample to be analysed is led through a dust filter to the module which consists of two magnet valves. The pump draws the sample over the measurement cell in which the CO molecules selectively absorb infrared radiation centered to a wavelength of 4.67 μm . An optical sensor as well as a light source are located within the measurement cell. A selective CO filter allows for zero point correction.

The **electronic component** consists of a power supply providing a supply voltage of 24 V. It is connected to the outlet as well as the connection card. The supply card provides additional internal supply voltage (24 V, 15 V, 5 V, 3.3 V). The control card controls general operation of the analyser (magnet valves, pressure and temperature control). The measurement card processes the measurement data and controls the motor and the infrared source. The HMI card controls the data output as well as the visualisation on the touch screen display.

General notes

This certificate is based upon the equipment tested. The manufacturer is responsible for ensuring that on-going production complies with the requirements of the EN 15267. The manufacturer is required to maintain an approved quality management system controlling the manufacture of the certified product. Both the product and the quality management systems shall be subject to regular surveillance.

If a product of the current production does not conform to the certified product, TÜV Rheinland Energy GmbH must be notified at the address given on page 1.

A certification mark with an ID-Number that is specific to the certified product is presented on page 1 of this certificate. This can be applied to the product or used in publicity material for the certified product is presented on page 1 of this certificate.

This document as well as the certification mark remains property of TÜV Rheinland Energy GmbH. With revocation of the publication the certificate loses its validity. After the expiration of the certificate and on requests of the TÜV Rheinland Energy GmbH this document shall be returned and the certificate mark must not be employed anymore.

The relevant version of this certificate and the validity is also accessible on the internet: gal1.de.

Certification of CO 12e for CO is based on the documents listed below and the regular, continuous monitoring of the Quality Management System of the manufacturer:

Initial certification according to EN 15267

Certificate No. 0000050626: 25 April 2016,
Expiration date of the certificate: 13 Month 2021,

Test report: 936/21228317/A dated 9 October 2015
TÜV Rheinland Energie und Umwelt GmbH, Cologne

Publication: BAnz AT 14.03.2016 B7, chapter III number 1.1,
Announcement by UBA from 18 February 2016

Expanded uncertainty based on the results of the laboratory testing of device 1

Measuring device:		CO 12e		Serial No.: SN 11		µmol/mol	
Measured component:		CO		8h-limit value:		8.62	
No.	Performance characteristic	Performance criterion	Result	Partial uncertainty	Square of partial uncertainty		
1	Repeatability standard deviation at zero	≤ 0.3 µmol/mol	0.000	u _{r,z}	0.0000		
2	Repeatability standard deviation at 8h-limit value	≤ 0.4 µmol/mol	0.030	u _r	0.0001		
3	"lack of fit" at 8h-limit value	≤ 4.0% of measured value	1.940	u _f	0.0093		
4	Sensitivity coefficient of sample gas pressure at 8h-limit value	≤ 0.7 µmol/mol/kPa	0.060	u _{sp}	0.0128		
5	Sensitivity coefficient of sample gas temperature at 8h-limit value	≤ 0.3 µmol/mol/K	0.000	u _{gt}	0.0000		
6	Sensitivity coefficient of surrounding temperature at 8h-limit value	≤ 0.3 µmol/mol/K	0.019	u _{st}	0.0020		
7	Sensitivity coefficient of electrical voltage at 8h-limit value	≤ 0.3 µmol/mol/V	0.000	u _v	0.0000		
8a	Interferent H ₂ O with 21 mmol/mol	≤ 1.0 µmol/mol (Zero)	0.290	u _{H2O}	0.0807		
8b	Interferent CO ₂ with 500 µmol/mol	≤ 1.0 µmol/mol (Span)	0.330	u _{int,pos}			
		≤ 0.5 µmol/mol (Zero)	-0.150				
8c	Interferent NO with 1 µmol/mol	≤ 0.5 µmol/mol (Span)	-0.140	0.08	0.0065		
		≤ 0.5 µmol/mol (Zero)	-0.060				
		≤ 0.5 µmol/mol (Span)	0.040				
		≤ 0.5 µmol/mol (Zero)	-0.050				
8d	Interferent N ₂ O with 50 nmol/mol	≤ 0.5 µmol/mol (Span)	0.060	u _{int,neg}			
9	Averaging effect	≤ 7.0% of measured value	-2.560	u _{av}	0.0162		
18	Difference sample/calibration port	≤ 1.0%	0.390	u _{sc}	0.0011		
21	Uncertainty of test gas	≤ 3.0%	2.000	u _{cg}	0.0074		
				Combined standard uncertainty		u _c	0.3408
				Expanded uncertainty		U	0.6815
				Relative expanded uncertainty		W	7.91
				Maximum allowed expanded uncertainty		W _{req}	15
							%

Expanded uncertainty based on the results of the laboratory testing of device 2

Measuring device:		Serial-No.:		SN 12	
Measured component:		8h-limit value:		8.62	
CO 12e				µmol/mol	
CO					
No.	Performance characteristic	Performance criterion	Result	Partial uncertainty	Square of partial uncertainty
1	Repeatability standard deviation at zero	≤ 0.3 µmol/mol	0.030	u _{r,z} 0.01	0.0001
2	Repeatability standard deviation at 8h-limit value	≤ 0.4 µmol/mol	0.050	u _r 0.01	0.0001
3	"lack of fit" at 8h-limit value	≤ 4.0% of measured value	2.060	u _l 0.10	0.0105
4	Sensitivity coefficient of sample gas pressure at 8h-limit value	≤ 0.7 µmol/mol/kPa	0.050	u _{sp} 0.11	0.0128
5	Sensitivity coefficient of sample gas temperature at 8h-limit value	≤ 0.3 µmol/mol/K	0.000	u _{gt} 0.00	0.0000
6	Sensitivity coefficient of surrounding temperature at 8h-limit value	≤ 0.3 µmol/mol/K	0.019	u _{st} 0.05	0.0020
7	Sensitivity coefficient of electrical voltage at 8h-limit value	≤ 0.3 µmol/mol/V	0.010	u _v 0.03	0.0008
8a	Interferent H ₂ O with 21 mmol/mol	≤ 1.0 µmol/mol (Zero) ≤ 1.0 µmol/mol (Span)	0.220 0.320	u _{r,z0} 0.24	0.0571
8b	Interferent CO ₂ with 500 µmol/mol	≤ 0.5 µmol/mol (Zero) ≤ 0.5 µmol/mol (Span)	-0.210 -0.090	u _{int,pos}	
8c	Interferent NO with 1 µmol/mol	≤ 0.5 µmol/mol (Zero) ≤ 0.5 µmol/mol (Span)	-0.030 0.000	0.05	0.0027
8d	Interferent N ₂ O with 50 mmol/mol	≤ 0.5 µmol/mol (Zero) ≤ 0.5 µmol/mol (Span)	-0.160 0.010	u _{int,neg}	
9	Averaging effect	≤ 7.0% of measured value	-2.610	u _{av} -0.13	0.0169
18	Difference sample/calibration port	≤ 1.0%	0.220	u _{acc} 0.02	0.0004
21	Uncertainty of test gas	≤ 3.0%	2.000	u _{cg} 0.09	0.0074
				Combined standard uncertainty	u _c 0.3327
				Expanded uncertainty	U 0.6655
				Relative expanded uncertainty	W 7.72
				Maximum allowed expanded uncertainty	W _{reg} 15

Expanded uncertainty based on the results of the laboratory and field testing of device 1

Measuring device:		Serial-No.:		SN 11	
Measured component:		8h-limit value:		8.62	
No.	Performance characteristic	Performance criterion	Result	Partial uncertainty	Square of partial uncertainty
				$u_{z,z}$	
1	Repeatability standard deviation at zero	≤ 0.3 µmol/mol	0.000	0.00	0.0000
2	Repeatability standard deviation at 8h-limit value	≤ 0.4 µmol/mol	0.030	not considered, as $u_r = 0 < u_{r,f}$	-
3	"lack of fit" at 8h-limit value	≤ 4.0% of measured value	1.940	u_t	0.0093
4	Sensitivity coefficient of sample gas pressure at 8h-limit value	≤ 0.7 µmol/mol/kPa	0.050	u_{sp}	0.0128
5	Sensitivity coefficient of sample gas temperature at 8h-limit value	≤ 0.3 µmol/mol/K	0.000	u_{pt}	0.0000
6	Sensitivity coefficient of surrounding temperature at 8h-limit value	≤ 0.3 µmol/mol/K	0.019	u_{st}	0.0020
7	Sensitivity coefficient of electrical voltage at 8h-limit value	≤ 0.3 µmol/mol/V	0.000	u_v	0.0000
8a	Interferent H ₂ O with 21 mmol/mol	≤ 1.0 µmol/mol (Zero)	0.290	u_{H_2O}	0.0607
		≤ 1.0 µmol/mol (Span)	0.330		
8b	Interferent CO ₂ with 500 µmol/mol	≤ 0.5 µmol/mol (Zero)	-0.150	$u_{CO_2, pos}$	
		≤ 0.5 µmol/mol (Span)	-0.140		
8c	Interferent NO with 1 µmol/mol	≤ 0.5 µmol/mol (Zero)	-0.060		
		≤ 0.5 µmol/mol (Span)	0.040	or	0.0065
		≤ 0.5 µmol/mol (Zero)	-0.050		
8d	Interferent N ₂ O with 50 mmol/mol	≤ 0.5 µmol/mol (Span)	0.060	$u_{N_2O, neg}$	
9	Averaging effect	≤ 7.0% of measured value	-2.560	u_{av}	0.0162
10	Reproducibility standard deviation under field conditions	≤ 5.0% of average over 3 months	1.790	$u_{r,f}$	0.0238
11	Long term drift at zero level	≤ 0.5 µmol/mol	0.230	$u_{d,l,z}$	0.0176
12	Long term drift at span level	≤ 5.0% of max. of certification range	0.700	$u_{d,l,sh}$	0.0012
18	Difference sample/calibration port	≤ 1.0%	0.390	u_{acc}	0.0011
21	Uncertainty of test gas	≤ 3.0%	2.000	u_{tg}	0.0074
Combined standard uncertainty				u_c	0.3984
Expanded uncertainty				U	0.7968
Relative expanded uncertainty				W	9.24
Maximum allowed expanded uncertainty				W_{max}	15

Measuring device:		CO 12e		Serial-No.:	SN 12		
Measured component:		CO		8h-limit value:	8.62	µmol/mol	
No.	Performance characteristic	Performance criterion	Result	Partial uncertainty	Square of partial uncertainty		
	Repeatability standard deviation at zero	s 0.3 µmol/mol	0.030	u _{r,2}	0.01		
2	Repeatability standard deviation at 8h-limit value	s 0.4 µmol/mol	0.050	u _r	not considered, as u _r = 0.01 < u _{r,f}		
3	"lack of fit" at 8h-limit value	s 4.0% of measured value	2.060	u _f	0.10	0.0105	
4	Sensitivity coefficient of sample gas pressure at 8h-limit value	s 0.7 µmol/mol/kPa	0.050	u _{sp}	0.11	0.0128	
5	Sensitivity coefficient of sample gas temperature at 8h-limit value	s 0.3 µmol/mol/K	0.000	u _{pt}	0.00	0.0000	
6	Sensitivity coefficient of surrounding temperature at 8h-limit value	s 0.3 µmol/mol/K	0.019	u _{st}	0.05	0.0020	
7	Sensitivity coefficient of electrical voltage at 8h-limit value	s 0.3 µmol/mol/V	0.010	u _v	0.03	0.0008	
8a	Interferent H ₂ O with 21 mmol/mol	s 1.0 µmol/mol (Zero) 1.0 µmol/mol (Span)	0.220 0.320	u _{H2O}	0.24	0.0571	
8b	Interferent CO ₂ with 500 µmol/mol	s 0.5 µmol/mol (Zero) 0.5 µmol/mol (Span)	-0.210 -0.090	u _{CO2, pos}			
8c	Interferent NO with 1 µmol/mol	s 0.5 µmol/mol (Zero) 0.5 µmol/mol (Span)	-0.030 0.000	or	0.05	0.0027	
8d	Interferent N ₂ O with 50 mmol/mol	s 0.5 µmol/mol (Zero) 0.5 µmol/mol (Span)	-0.160 0.010	u _{N2O, neg}			
9	Averaging effect	s 7.0% of measured value	-2.610	u _{av}	-0.13	0.0169	
10	Reproducibility standard deviation under field conditions	s 5.0% of average over 3 months	1.790	u _{r,1}	0.15	0.0238	
11	Long term drift at zero level	s 0.5 µmol/mol	0.160	u _{d,1,2}	0.09	0.0085	
12	Long term drift at span level	s 5.0% of max. of certification range	0.890	u _{d,1,8h}	0.04	0.0020	
18	Difference sample/calibration port	s 1.0%	0.220	u _{asc}	0.02	0.0004	
21	Uncertainty of test gas	s 3.0%	2.000	u _{cg}	0.09	0.0074	
Combined standard uncertainty				u _c		0.3806	
Expanded uncertainty				U		0.7613	
Relative expanded uncertainty				W		8.83	
Maximum allowed expanded uncertainty				W _{req}		15	



CERTIFICATE

of Product Conformity (QAL1)

Certificate No.: 0000053805

Certified AMS: AC 32e for NO, NO₂, NO_x

Manufacturer: Environnement S. A.
111, Boulevard Robespierre
78304 Poissy Cedex
France

Test Institute: TÜV Rheinland Energy GmbH

This is to certify that the AMS has been tested and certified according to the standards

**VDI 4202-1 (2010), VDI 4203-3 (2010), EN 14211 (2012),
EN 15267-1 (2009) and EN 15267-2 (2009).**

Certification is awarded in respect of the conditions stated in this certificate (this certificate contains 9 pages).



Suitability Tested
Complying with
2008/50/EC
EN 15267
Regular
Surveillance
www.tuv.com
ID 0000053805

Publication in the German Federal Gazette (BAnz.) of 15 March 2017

This certificate will expire on:
14 March 2022

German Federal Environment Agency
Dessau, 25 April 2017

TÜV Rheinland Energy GmbH
Cologne, 24 April 2017

Dr. Marcel Langner
Head of Section II 4.1

ppa. Dr. Peter Wilbring

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TÜV Rheinland Energy GmbH
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51105 Köln

Test Institute accredited to EN ISO/IEC 17025:2005 by DAkkS (German Accreditation Body).
This accreditation is limited to the accreditation scope defined in the enclosure to the certificate D-PL-11120-02-00.
qal1.de info@qal1.de page 1 of 9

Test report: 936/21233023/A dated 13 October 2016
Initial certification: 15 March 2017
Expiry date: 14 March 2022
Publication: BAnz AT 15.03.2017 B6, chapter III no. 1.1

Approved application

The tested AMS is suitable for continuous ambient air monitoring of nitrogen oxide (stationary operation).

The suitability of the AMS for this application was assessed on the basis of a laboratory test and a three-month field test.

The AMS is approved for an ambient temperature range of 0 °C to +30 °C.

The notification of suitability of the AMS, performance testing, and the uncertainty calculation have been effected on the basis of the regulations valid at the time of performance testing. As changes in legal regulations are possible, any potential user should ensure that this AMS is suitable for monitoring the limit value relevant to the application.

Any potential user should ensure, in consultation with the manufacturer, that this AMS is suitable for the ambient air application at which it will be installed.

Basis of the certification

This certification is based on:

- Test report 936/21233023/A dated 13 October 2016 of TÜV Rheinland Energy GmbH
- Suitability announced by the German Federal Environment Agency (UBA) as the relevant body
- The ongoing surveillance of the product and the manufacturing process

Publication in the German Federal Gazette: BAnz AT 15.03.2017 B6, chapter III no. 1.1,
Announcement by UBA from 22 February 2017

AMS designation:

AC 32e for NO, NO₂ and NO_x

Manufacturer:

Environnement S. A., Poissy, France

Field of application:

For continuous ambient air monitoring (stationary operation) of nitrogen oxide

Measuring ranges during the performance test:

Component	Certification range	Unit
Nitrogen monoxide	0 - 1200	µg/m ³
Nitrogen dioxide	0 - 500	µg/m ³

Software version:

Firmware: 1.0.a

Restrictions:

none

Notes:

1. Performance testing also covered the AC 32e* version (without display) of the measuring system. This version displays measured values via a PC or laptop accompanying the measuring system.
2. The test report on performance testing is available on the internet at www.qal1.de.

Test report:

TÜV Rheinland Energy GmbH, Cologne
Report No.: 936/21233023/A dated 13 October 2016

Certified product

This certificate applies to automated measurement systems conforming to the following description:

The AC 32e air quality monitoring system is a continuous nitrogen oxide analyser. The measuring principle relies on the chemiluminescence method.

The main switch of the measuring system and a TFT-LCD colour display with background lighting and touch screen is located at the front of the instrument. This touch screen ensures operation of the AC 32e NO_x analyser. The AC 32e* version is identical to the AC 32e measuring system (apart from its front design), but it does not have a display. The AC 32e* measuring system is only operated via an external PC connected via Ethernet.

Fluid in- and outlets and electrical connections are located on the back of the analyser.

The instrument is operated with an external vacuum pump.

In the analyser, sample gas flows to a solenoid valve unit via an inlet filter. At this point, the relevant inlet can be selected (sample, zero gas, span gas). The dryer between the dust filter and the solenoid valves allows the removal of all interferences from moisture.

The sample is sucked into the reaction chamber directly; for the NO cycle and indirectly via the NO₂→NO converter oven.

The ozoniser generates the necessary ozone for measurements from ambient air. Dust is removed from the air sucked in before the latter is transported through a drier. At the outlet of the ozone generator, the ozone passes through cleaning before it reaches the reaction chamber inside the measuring module. The ozoniser chip ensures the energy supply of the ozone generator.

Furthermore, the dryer provides purge air for the conversion of the photomultiplier tube after flow through of the purge dryer filter.

The vacuum distributor connected to the external pump connects all internal elements which require subatmospheric pressure.

The current software version is Firmware: 1.0.a.

The current version of the operation manual is dated July 2016.

General notes

This certificate is based upon the equipment tested. The manufacturer is responsible for ensuring that on-going production complies with the requirements of the EN 15267. The manufacturer is required to maintain an approved quality management system controlling the manufacture of the certified product. Both the product and the quality management systems shall be subject to regular surveillance.

If a product of the current production does not conform to the certified product, TÜV Rheinland Energy GmbH must be notified at the address given on page 1.

A certification mark with an ID-Number that is specific to the certified product is presented on page 1 of this certificate. This can be applied to the product or used in publicity material for the certified product.

This document as well as the certification mark remains property of TÜV Rheinland Energy GmbH. With revocation of the publication the certificate loses its validity. After the expiration of the certificate and on requests of the TÜV Rheinland Energy GmbH this document shall be returned and the certificate mark must not be employed anymore.

The relevant version of this certificate and its expiration is also accessible on the internet: qal1.de.

Certification of AC 32e is based on the documents listed below and the regular, continuous monitoring of the Quality Management System of the manufacturer:

Initial certification according to EN 15267

Certificate No. 0000053805: 25 April 2017
Expiry date of the certificate: 14 March 2022

Test report: 936/21233023/A dated 13 October 2016
TÜV Rheinland Energy GmbH, Cologne
Publication: BAnz AT 15.03.2017 B6, chapter III no. 1.1
Announcement by UBA dated 22 February 2017

Expanded uncertainty, System 1

Measuring device:		AC 32e		Serial-No.:		SN 5	
Measured component:		NO		1h-limit value:		104.6	
No.	Performance characteristic	Performance criterion	Result	Partial uncertainty	Square of partial uncertainty	nmol/mol	
1	Repeatability standard deviation at zero	≤ 1.0 nmol/mol	0.050	$u_{r,z}$	0.01	0.0000	
2	Repeatability standard deviation at 1h-limit value	≤ 3.0 nmol/mol	0.940	$u_{r,h}$	0.02	0.0005	
3	"lack of fit" at 1h-limit value	≤ 4.0% of measured value	0.790	$u_{l,h}$	0.48	0.2276	
4	Sensitivity coefficient of sample gas pressure at 1h-limit value	≤ 8.0 nmol/mol/kPa	0.740	u_{gp}	1.86	3.4672	
5	Sensitivity coefficient of sample gas temperature at 1h-limit value	≤ 3.0 nmol/mol/K	0.190	u_{gt}	0.48	0.2286	
6	Sensitivity coefficient of surrounding temperature at 1h-limit value	≤ 3.0 nmol/mol/K	0.947	u_{st}	2.38	5.6783	
7	Sensitivity coefficient of electrical voltage at 1h-limit value	≤ 0.30 nmol/mol/V	0.020	u_{vy}	0.06	0.0034	
8a	Interferent H ₂ O with 21 nmol/mol	≤ 10 nmol/mol (Zero) ≤ 10 nmol/mol (Span)	-0.220 3.870	u_{H_2O}	0.47	0.2178	
8b	Interferent CO ₂ with 500 µmol/mol	≤ 5.0 nmol/mol (Zero) ≤ 5.0 nmol/mol (Span)	0.290 -0.470	$u_{CO_2, pos}$ or	0.38	0.1456	
8c	Interferent NH ₃ mit 200 nmol/mol	≤ 5.0 nmol/mol (Zero) ≤ 5.0 nmol/mol (Span)	0.120 2.070	$u_{NH_3, neg}$			
9	Averaging effect	≤ 7.0% of measured value	-2.330	u_{av}	-1.41	1.9799	
18	Difference sample/calibration port	≤ 1.0%	0.240	u_{asc}	0.25	0.0630	
21	Converter efficiency	≥ 98	98.40	u_{ec}	0.63	0.3939	
23	Uncertainty of test gas	≤ 3.0%	2.000	u_{cg}	1.05	1.0941	
Combined standard uncertainty				u_c		3.6743	
Expanded uncertainty				U		7.3486	
Relative expanded uncertainty				W		7.03	
Maximum allowed expanded uncertainty				W_{req}		15	

Expanded uncertainty, System 2

Measuring device:		AC 32e		Serial-No.:		SN 6	
Measured component:		NO		1h-limit value:		104.6 nmol/mol	
No.	Performance characteristic	Performance criterion	Result	Partial uncertainty	Square of partial uncertainty		
1	Repeatability standard deviation at zero	≤ 1.0 nmol/mol	0.040	$u_{r,z}$	0.00	0.0000	
2	Repeatability standard deviation at 1h-limit value	≤ 3.0 nmol/mol	0.910	$u_{r,h}$	0.02	0.0005	
3	"lack of fit" at 1h-limit value	≤ 4.0% of measured value	1.000	$u_{l,h}$	0.60	0.3647	
4	Sensitivity coefficient of sample gas pressure at 1h-limit value	≤ 8.0 nmol/mol/kPa	0.970	u_{sp}	2.44	5.9575	
5	Sensitivity coefficient of sample gas temperature at 1h-limit value	≤ 3.0 nmol/mol/K	0.130	u_{gt}	0.33	0.1070	
6	Sensitivity coefficient of surrounding temperature at 1h-limit value	≤ 3.0 nmol/mol/K	1.667	u_{st}	4.19	17.5951	
7	Sensitivity coefficient of electrical voltage at 1h-limit value	≤ 0.30 nmol/mol/V	0.030	u_v	0.09	0.0078	
8a	Interferent H ₂ O with 21 nmol/mol	≤ 10 nmol/mol (Zero) ≤ 10 nmol/mol (Span)	0.040 2.600	u_{H_2O}	0.42	0.1804	
8b	Interferent CO ₂ with 500 µmol/mol	≤ 5.0 nmol/mol (Zero) ≤ 5.0 nmol/mol (Span)	0.180 0.030	$u_{int,pos}$ or	0.53	0.2797	
8c	Interferent NH ₃ mit 200 nmol/mol	≤ 5.0 nmol/mol (Zero) ≤ 5.0 nmol/mol (Span)	0.290 2.570	$u_{int,neg}$			
9	Averaging effect	≤ 7.0% of measured value	3.930	u_{av}	2.37	5.6328	
18	Difference sample/calibration port	≤ 1.0%	-0.280	u_{sc}	-0.29	0.0858	
21	Converter efficiency	≥ 98	99.20	u_{ec}	0.84	0.7002	
23	Uncertainty of test gas	≤ 3.0%	2.000	u_{cg}	1.05	1.0941	
Combined standard uncertainty				u_c		5.6574 nmol/mol	
Expanded uncertainty				U		11.3148 nmol/mol	
Relative expanded uncertainty				W		10.82 %	
Maximum allowed expanded uncertainty				W_{req}		15 %	

Combined standard uncertainty, System 1

Measuring device:		AC 32e		Serial-No.:		SN 5	
Measured component:		NO		1h-limit value:		104,6	
No.	Performance characteristic	Performance criterion	Result	Partial uncertainty	Square of partial uncertainty	mmol/mol	
1	Repeatability standard deviation at zero	s 1.0 nmol/mol	0,050	$u_{r,z}$	0,01	0,0000	
2	Repeatability standard deviation at 1h-limit value	s 3.0 nmol/mol	0,940	$u_{r,h}$	not considered, as $\sqrt{2} \cdot u_{r,h} = 0,03 < u_{r,f}$		
3	"lack of fit" at 1h-limit value	s 4.0% of measured value	0,790	$u_{l,h}$	0,48	0,2276	
4	Sensitivity coefficient of sample gas pressure at 1h-limit value	s 8.0 nmol/mol/kPa	0,740	u_{p}	1,96	3,4672	
5	Sensitivity coefficient of sample gas temperature at 1h-limit value	s 3.0 nmol/mol/K	0,190	u_{t}	0,48	0,2286	
6	Sensitivity coefficient of surrounding temperature at 1h-limit value	s 3.0 nmol/mol/K	0,947	u_{st}	2,38	5,6783	
7	Sensitivity coefficient of electrical voltage at 1h-limit value	s 0.30 nmol/mol/V	0,020	u_{v}	0,06	0,0034	
8a	Interferent H ₂ O with 21 nmol/mol	s 10 nmol/mol (Zero)	-0,220	u_{H_2O}	0,47	0,2178	
		s 10 nmol/mol (Span)	3,870				
8b	Interferent CO ₂ with 500 µmol/mol	s 5.0 nmol/mol (Zero)	0,280	u_{int,CO_2}			
		s 5.0 nmol/mol (Span)	-0,470	or			
8c	Interferent NH ₃ mit 200 nmol/mol	s 5.0 nmol/mol (Zero)	0,120		0,38	0,1456	
		s 5.0 nmol/mol (Span)	2,070				
9	Averaging effect	s 7.0% of measured value	-2,330	u_{av}	-1,41	1,9799	
10	Reproducibility standard deviation under field conditions	s 5.0% of average over 3 months	1,570	$u_{r,1}$	1,64	2,6989	
11	Long term drift at zero level	s 5.0 nmol/mol	1,580	$u_{d,1,2}$	0,91	0,8321	
12	Long term drift at span level	s 5.0% of max. of certification range	2,430	$u_{d,1,h}$	1,47	2,1535	
18	Difference sample/calibration port	s 1.0%	0,240	u_{sc}	0,25	0,0630	
21	Converter efficiency	98	99,400	u_{cc}	0,83	0,3939	
23	Uncertainty of test gas	s 3.0%	2,000	u_{cg}	1,05	1,0941	
Combined standard uncertainty						u_c	4,3797
Expanded uncertainty						U	8,7595
Relative expanded uncertainty						W	8,37
Maximum allowed expanded uncertainty						W_{req}	15

Combined standard uncertainty, System 2

Measuring device: AC 32e		Serial-No.: SN 6		mmol/mol	
Measured component: NO		1h-limit value:		104.6	
No.	Performance characteristic	Performance criterion	Result	Partial uncertainty	Square of partial uncertainty
1	Repeatability standard deviation at zero	≤ 1.0 nmol/mol	0.040	u _{r,z}	0.0000
2	Repeatability standard deviation at 1h-limit value	≤ 3.0 nmol/mol	0.910	u _{r,1h}	-
3	"lack of fit" at 1h-limit value	≤ 4.0% of measured value	1.000	u _{l,1h}	0.3847
4	Sensitivity coefficient of sample gas pressure at 1h-limit value	≤ 8.0 nmol/mol/kPa	0.970	u _{sp}	5.9575
5	Sensitivity coefficient of sample gas temperature at 1h-limit value	≤ 3.0 nmol/mol/K	0.130	u _g	0.1070
6	Sensitivity coefficient of surrounding temperature at 1h-limit value	≤ 3.0 nmol/mol/K	1.667	u _s	17.5951
7	Sensitivity coefficient of electrical voltage at 1h-limit value	≤ 0.30 nmol/mol/V	0.030	u _v	0.0078
8a	Interferent H ₂ O with 21 nmol/mol	≤ 10 nmol/mol (Zero)	0.040	u _{H2O}	0.1804
		≤ 10 nmol/mol (Span)	2.600		
8b	Interferent CO ₂ with 500 µmol/mol	≤ 5.0 nmol/mol (Zero)	0.160	u _{int,pos}	
		≤ 5.0 nmol/mol (Span)	0.030	or	
8c	Interferent NH ₃ mit 200 nmol/mol	≤ 5.0 nmol/mol (Zero)	0.280	u _{int,neg}	0.2797
		≤ 5.0 nmol/mol (Span)	2.570		
9	Averaging effect	≤ 7.0% of measured value	3.930	u _{av}	5.6328
10	Reproducibility standard deviation under field conditions	≤ 5.0% of average over 3 months	1.570	u _{r,f}	2.8989
11	Long term drift at zero level	≤ 5.0 nmol/mol	2.140	u _{l,z}	1.5285
12	Long term drift at span level	≤ 5.0% of max. of certification range	0.870	u _{l,1h}	0.2760
18	Difference sample/calibration port	≤ 1.0%	-0.260	u _{sc}	0.0858
21	Converter efficiency	≤ 98	98.200	u _{cc}	0.7002
23	Uncertainty of test gas	≤ 3.0%	2.000	u _{cg}	1.0841
				u _c	6.0419
				U	12.0838
				W	11.55
				W _{req}	15

CERTIFICATE

of Product Conformity (QAL1)

Certificate number: 0000043106_01

Certified AMS: O3 42e* resp. O3 42e for Ozone

Manufacturer: Environnement S.A.,
111 bd, Robespierre
78304 Poissy Cedex
France

Test Institute: TÜV Rheinland Energy GmbH

**This is to certify that the AMS has been tested and certified
according to the standards**

**VDI 4202-1 (2010), VDI 4203-3 (2010), EN 14625 (2012),
EN 15267-1 (2009) and EN 15267-2 (2008).**

Certification is awarded in respect of the conditions stated in this certificate
(this certificate contains 10 pages).

The present certificate replaces certificate 0000043106 of 30 April 2015.



Suitability Tested
Complying with
2008/50/EC
EN 15267
Regular
Surveillance

www.tuv.com
ID 0000043106

Publication in the German Federal Gazette
(BAnz.) of 1 August 2016

German Federal Environment Agency
Dessau, 19 August 2016


Dr. Marcel Langner
Head of Section II 4.1

This certificate will expire on:
1 April 2020

TÜV Rheinland Energy GmbH
Cologne, 18 August 2016


ppa. Dr. Peter Wilbring

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TÜV Rheinland Energy GmbH
Am Grauen Stein
51105 Köln

Test institute accredited to EN ISO/IEC 17025:2005 by DAkkS (German Accreditation Body).
This accreditation is limited to the accreditation scope defined in the enclosure to the certificate D-PL-11120-02-00

Test report:	936/21225396/B of 26 February 2016
Initial certification:	2 April 2015
Expiry date:	1 April 2020
Publication:	BAnz AT 01.08.2016 B11, chapter III number 1.1

Approved application

The tested AMS is suitable for continuous ambient air monitoring of ozone (stationary operation).

The suitability of the AMS for this application was assessed on the basis of a laboratory test and a three-month field test.

The AMS is approved for the temperature range of 0 °C to +30 °C.

The notification of suitability of the AMS, performance testing, and the uncertainty calculation have been effected on the basis of the regulations valid at the time of performance testing. As changes in legal regulations are possible, any potential user should ensure that this AMS is suitable for monitoring the limit value relevant to the application.

Any potential user should ensure, in consultation with the manufacturer, that this AMS is suitable for ambient air applications at which it will be installed.

Basis of the certification

This certification is based on:

- Test report 936/21225396/B of 26 February 2016 of TÜV Rheinland Energie und Umwelt GmbH
- Suitability announced by the German Federal Environment Agency (UBA) as the relevant body
- The ongoing surveillance of the product and the manufacturing process

Publication in the German Federal Gazette: BAnz AT 01.08.2016 B11, chapter III number 1.1,
Announcement by UBA from 14 July 2016:

AMS designation:

O3 42e* resp. O3 42e for Ozone

Manufacturer:

Environnement S.A., Poissy, France

Field of application:

The tested AMS is suitable for continuous ambient air monitoring of ozone
(stationary operation).

Measuring ranges during the performance test:

Component	Certification range	Unit
Ozone	0 - 500	µg/m ³

Software version:

O342e Version: 1.0.4

O342e* Version: 1.0.3

Restrictions:

None

Notes:

1. Measured values are displayed by means of a connected PC or Laptop
2. The performance test includes also the version O3 42e with integrated Display.
3. The report on the performance test is available online at www.gal1.de.
4. Supplementary testing (optimisation of wavelength range of LED as well as pressure compensation) to the announcement of the Federal Environment Agency (UBA) of 25 February 2015 (BAnz AT 02.04.2015 B5, chapter III number 1.1) and of 22 July 2015 (BAnz AT 26.08.2015 B4, chapter IV notification 47).

Test report:

TÜV Rheinland Energie und Umwelt GmbH, Cologne
Report No.: 936/21225396/B of 26 February 2016

Certified product

This certificate applies to automated measurement systems conforming to the following description:

The ambient air monitor O3 42e* is a continuous ozone monitor. The measurement principle is based on ultraviolet absorption. The instrument was developed for the continuous measurement of ozone concentrations in ambient air.

The measurement principle of the O3 42e* is based on UV photometry according to the Beer-Lambert law. The absorption spectrum of ozone has its maximum in the wavelength range of 250 to 270 nanometres. The monochromatic UV-LED light source of the O3 42e* is adjusted to a wavelength of 255 nm and therefore within the maximum absorption range of ozone.

The O3 42e* analyser uses non-dispersive ultraviolet (UV) absorption technology to measure ozone concentrations. The sample to be analysed is led to the measurement module via a dust filter. The measurement module consists of the following parts:

- LED for monochromatic UV-light with a wavelength of 255 nm, placed under a protective cover, which is fastened with 4 screws. The LED card is directly connected to the card of the reference photodetector.
- two photodetector cards: the reference photodetector card for measuring the energy of the incoming LED light (UV_0) and the photodetector card for measuring UV absorption, which enables detection of signals i and i_0 . Both cards are mounted beneath a protective cover to protect them against interfering light.
- the optical chamber consists of a beam splitter and a convex, flat lense for concentrating the light on the reference photodetector. In the optical chamber, the LED light can be distributed to reference photodetector and measuring chamber.
- a measurement chamber consisting of a glass tube and two mechanical parts at the inlet and outlet where the LED light is absorbed. The optical path length for the sample gas is 400 mm.
- cycle solenoid valve by means of which the sample gas can either cyclically or alternately be changed over to cycle channel i or cycle channel i_0 .
- a flow restrictor which regulates the sample gas flow to 55 litres/hour. The excess flow valve is mounted at the fluid outlet of the measurement chamber.
- ozone filter which can filter out any trace of ozone from the sample gas
- connection for the pressure sensor
- Type PT1000 temperature sensor
- gas inlet

The AMS is available in two versions:

- The version **O3 42e** is fitted with a TFT LCD coloured display with backlight and a touch screen function. Signal output as well as operation can also be carried out via the web browser using an external PC connected via Ethernet.
- The version **O3 42e *** is not fitted with a display. Signal output as well as operation can only be operated via the web browser on an external PC connected via Ethernet.

Apart from that, both versions of the AMS are of identical design.

General notes

This certificate is based upon the equipment tested. The manufacturer is responsible for ensuring that on-going production complies with the requirements of the EN 15267. The manufacturer is required to maintain an approved quality management system controlling the manufacture of the certified product. Both the product and the quality management systems shall be subject to regular surveillance.

If a product of the current production does not conform to the certified product, TÜV Rheinland Energy GmbH must be notified at the address given on page 1.

A certification mark with an ID-Number that is specific to the certified product is presented on page 1 of this certificate. This can be applied to the product or used in publicity material for the certified product.

This document as well as the certification mark remains property of TÜV Rheinland Energy GmbH. With revocation of the publication the certificate loses its validity. After the expiration of the certificate and on requests of the TÜV Rheinland Energy GmbH this document shall be returned and the certificate mark must not be employed anymore.

The relevant version of this certificate and its expiration is also accessible on the internet: gal1.de.

Certification of O3 42e* resp. O3 42e for Ozone is based on the documents listed below and the regular, continuous monitoring of the Quality Management System of the manufacturer:

Initial certification according to EN 15267

Certificate No. 0000043106: 30 April 2015
Expiration date of the certificate: 1 April 2020

Test report: 936/21225396/A of 1 October 2014
TÜV Rheinland Energie und Umwelt GmbH, Cologne

Publication: BAnz AT 02.04.2015 B5, chapter III number 1.1
Announcement by UBA from 25 February 2015

Notifications according to EN 15267

Statement of TÜV Rheinland Energie und Umwelt GmbH, Cologne of 16 March 2015,
Publication: BAnz AT 26.08.2015 B4, chapter IV notification 47,
Announcement by UBA from 22 July 2015
(new software version)

Supplementary testing according to EN 15267

Certificate No. 0000043106_01: 19 August 2016
Expiry date of the certificate: 1 April 2020

Test report: 936/21225396/B of 26 February 2016
TÜV Rheinland Energie und Umwelt GmbH, Cologne,

Publication: BAnz AT 01.08.2016 B11, chapter III number 1.1
Announcement by UBA from 14 July 2016

Expanded uncertainty, System 1

Measuring device:		Environment O3 42e*		Serial-No.:		SN 12 / SN 23		nmol/mol	
Measured component:		O ₃		1h-alert threshold:		120			
No.	Performance characteristic	Performance criterion	Result	Partial uncertainty	Square of partial uncertainty				
1	Repeatability standard deviation at zero	≤ 1.0 nmol/mol	0.020	$u_{r,z}$	0.0000				
2	Repeatability standard deviation at 1h-alert threshold	≤ 3.0 nmol/mol	0.070	$u_{r,th}$	0.0001				
3	"lack of fit" at 1h-alert threshold	≤ 4.0% of measured value	0.880	$u_{l,th}$	0.3717				
4	Sensitivity coefficient of sample gas pressure at 1h-alert threshold	≤ 2.0 nmol/mol/kPa	0.130	u_{sp}	2.0656				
5	Sensitivity coefficient of sample gas temperature at 1h-alert threshold	≤ 1.0 nmol/mol/K	0.010	u_{gt}	0.0122				
6	Sensitivity coefficient of surrounding temperature at 1h-alert threshold	≤ 1.0 nmol/mol/K	0.392	u_{st}	8.5280				
7	Sensitivity coefficient of electrical voltage at 1h-alert threshold	≤ 0.30 nmol/mol/V	0.010	u_v	0.0166				
8a	Interferent H ₂ O with 21 mmol/mol	≤ 10 nmol/mol (Zero) ≤ 10 nmol/mol (Span)	0.300 -2.870	u_{H_2O}	4.5862				
8b	Interferent Toluene with 0.5 µmol/mol	≤ 5.0 nmol/mol (Zero) ≤ 5.0 nmol/mol (Span)	0.870 0.400	$u_{int,pos}$ or	0.6533				
8c	Interferent Xylene with 0.5 µmol/mol	≤ 5.0 nmol/mol (Zero) ≤ 5.0 nmol/mol (Span)	1.760 1.000	$u_{int,neg}$					
9	Averaging effect	≤ 7.0% of measured value	-4.280	u_{av}	8.7928				
18	Difference sampler/calibration port	≤ 1.0%	-0.350	u_{acc}	0.1764				
21	Uncertainty of test gas	≤ 3.0%	2.000	u_{tg}	1.4400				
Combined standard uncertainty				u_c	5.1617	nmol/mol			
Expanded uncertainty				U	10.3234	nmol/mol			
Relative expanded uncertainty				W	8.60	%			
Maximum allowed expanded uncertainty				W_{req}	15	%			

Expanded uncertainty, System 2

Measuring device:		Serial-No.:		SN 14 / SN 24	
Measured component:		1h-alert threshold:		120	
Environment O3 42e		O ₃		nmol/mol	
No.	Performance characteristic	Performance criterion	Result	Partial uncertainty	Square of partial uncertainty
1	Repeatability standard deviation at zero	≤ 1.0 nmol/mol	0.020	u _{r,z}	0.0000
2	Repeatability standard deviation at 1h-alert threshold	≤ 3.0 nmol/mol	0.090	u _{r,v}	0.0002
3	"lack of fit" at 1h-alert threshold	≤ 4.0% of measured value	2.370	u _{lv}	2.6961
4	Sensitivity coefficient of sample gas pressure at 1h-alert threshold	≤ 2.0 nmol/mol/kPa	0.030	u _{gp}	0.1124
5	Sensitivity coefficient of sample gas temperature at 1h-alert threshold	≤ 1.0 nmol/mol/K	0.020	u _{gt}	0.0489
6	Sensitivity coefficient of surrounding temperature at 1h-alert threshold	≤ 1.0 nmol/mol/K	0.231	u _{st}	2.9614
7	Sensitivity coefficient of electrical voltage at 1h-alert threshold	≤ 0.30 nmol/mol/V	0.020	u _v	0.0665
8a	Interferent H ₂ O with 21 mmol/mol	≤ 10 nmol/mol (Zero)	0.530	u _{r20}	4.0590
		≤ 10 nmol/mol (Span)	-2.700		
8b	Interferent Toluene with 0.5 µmol/mol	≤ 5.0 nmol/mol (Zero)	0.930	u _{r, pos}	
		≤ 5.0 nmol/mol (Span)	0.400	or	0.5633
8c	Interferent Xylene with 0.5 µmol/mol	≤ 5.0 nmol/mol (Zero)	1.100		
		≤ 5.0 nmol/mol (Span)	0.900	u _{r, neg}	
9	Averaging effect	≤ 7.0% of measured value	-4.770	u _{av}	10.9214
18	Difference sample/calibration port	≤ 1.0%	-0.360	u _{sc}	0.1866
21	Uncertainty of test gas	≤ 3.0%	2.000	u _{cg}	1.4400
Combined standard uncertainty				u _c	4.8017
Expanded uncertainty				U	9.6033
Relative expanded uncertainty				W	8.00
Maximum allowed expanded uncertainty				W _{req}	15

Combined standard uncertainty, System 1

Measuring device: Environment O3 42e*		Serial-No.: SN 12 / SN 23		120		nmol/mol	
Measured component: O ₃		1h-alert threshold:		0.00		0.0000	
No.	Performance characteristics	Performance criterion	Result	Partial uncertainty	Square of partial uncertainty		
1	Repeatability standard deviation at zero	≤ 1.0 nmol/mol	0.020	u _{r,z}	0.00		
2	Repeatability standard deviation at 1h-alert threshold	≤ 3.0 nmol/mol	0.070	u _{r,1h}	not considered, as u _{r,1h} = 0.01 < u _{r,f}		
3	"lack of fit" at 1h-alert threshold	≤ 4.0% of measured value	0.880	u _{l,1h}	0.61	0.3717	
4	Sensitivity coefficient of sample gas pressure at 1h-alert threshold	≤ 2.0 nmol/mol/kPa	0.130	u _{sp}	1.44	2.0656	
5	Sensitivity coefficient of sample gas temperature at 1h-alert threshold	≤ 1.0 nmol/mol/K	0.010	u _{pt}	0.11	0.0122	
6	Sensitivity coefficient of surrounding temperature at 1h-alert threshold	≤ 1.0 nmol/mol/K	0.392	u _{st}	2.92	8.5280	
7	Sensitivity coefficient of electrical voltage at 1h-alert threshold	≤ 0.30 nmol/mol/V	0.010	u _v	0.13	0.0166	
8a	Interferent H ₂ O with 21 nmol/mol	≤ 10 nmol/mol (Zero) ≤ 10 nmol/mol (Span)	0.300 -2.870	u _{H2O}	-2.14	4.5862	
8b	Interferent Toluene with 0.5 µmol/mol	≤ 5.0 nmol/mol (Zero) ≤ 5.0 nmol/mol (Span)	0.870 0.400	u _{tol,pos} or	0.81	0.6533	
8c	Interferent Xylene with 0.5 µmol/mol	≤ 5.0 nmol/mol (Zero) ≤ 5.0 nmol/mol (Span)	1.760 1.000	u _{tol,neg}			
9	Averaging effect	≤ 7.0% of measured value	-4.260	u _{av}	-2.97	8.7928	
10	Reproducibility standard deviation under field conditions	≤ 5.0% of average over 3 months	2.590	u _{r,f}	3.11	9.6597	
11	Long term drift at zero level	≤ 5.0 nmol/mol	0.590	u _{d,12}	0.34	0.1160	
12	Long term drift at span level	≤ 5.0% of max. of certification range	1.190	u _{d,1h}	0.82	0.6797	
18	Difference sample/calibration port	≤ 1.0%	-0.350	u _{base}	-0.42	0.1764	
21	Uncertainty of test gas	≤ 3.0%	2.000	u _{sp}	1.20	1.4400	
				Combined standard uncertainty		u _c	
				Expanded uncertainty		U	
				Relative expanded uncertainty		W	
				Maximum allowed expanded uncertainty		W _{req}	
						nmol/mol	
						nmol/mol	
						%	
						%	

Combined standard uncertainty, System 2

Measuring device: Environment O3 42e*		Serial-No.: SN 14 / SN 24		120		nmol/mol
Measured component: O ₃		1h-alert threshold:		Square of partial uncertainty		
No.	Performance characteristic	Performance criterion	Result	Partial uncertainty	1h-alert threshold:	
1	Repeatability standard deviation at zero	s 1.0 nmol/mol	0.020	u _{r,z}	0.00	0.0000
2	Repeatability standard deviation at 1h-alert threshold	s 3.0 nmol/mol	0.090	u _{r,h}	not considered, as u _{r,h} = 0.01 < u _{r,f}	-
3	"lack of fit" at 1h-alert threshold	s 4.0% of measured value	2.370	u _{f,h}	1.64	2.6961
4	Sensitivity coefficient of sample gas pressure at 1h-alert threshold	s 2.0 nmol/mol/kPa	0.030	u _{sp}	0.34	0.1124
5	Sensitivity coefficient of sample gas temperature at 1h-alert threshold	s 1.0 nmol/mol/K	0.020	u _{tr}	0.22	0.0489
6	Sensitivity coefficient of surrounding temperature at 1h-alert threshold	s 1.0 nmol/mol/K	0.231	u _{st}	1.72	2.9614
7	Sensitivity coefficient of electrical voltage at 1h-alert threshold	s 0.30 nmol/mol/V	0.020	u _v	0.26	0.0665
8a	Interferent H ₂ O with 21 nmol/mol	s 10 nmol/mol (Zero)	0.530	u _{h2o}	-2.01	4.0590
8b	Interferent Toluene with 0.5 µmol/mol	s 10 nmol/mol (Span)	-2.700	u _{tol,pos}		
8c	Interferent Xylene with 0.5 µmol/mol	s 5.0 nmol/mol (Zero)	0.930	u _{tol,neg}	0.75	0.5633
9	Averaging effect	s 5.0 nmol/mol (Span)	0.400	or		
10	Reproducibility standard deviation under field conditions	s 5.0 nmol/mol (Zero)	1.100	u _{reprod,neg}		
11	Long term drift at zero level	s 7.0% of measured value	-4.770	u _{av}	-3.30	10.9214
12	Long term drift at span level	s 5.0% of average over 3 months	2.590	u _{r,f}	3.11	9.6597
18	Difference sample/calibration port	s 5.0% of max. of certification range	0.810	u _{d,z}	0.47	0.2187
21	Uncertainty of test gas	s 1.0%	1.450	u _{d,h}	1.00	1.0092
		s 3.0%	-0.360	u _{acc}	-0.43	0.1866
			2.000	u _{cg}	1.20	1.4400
	Combined standard uncertainty			u _c		5.8261
	Expanded uncertainty			U		11.6522
	Relative expanded uncertainty			W		9.71
	Maximum allowed expanded uncertainty			W _{req}		15

CERTIFICATE

TUV Approved

Certificate number: 0000054060_00

Manufacturer: Mega System s.r.l.
Via Don Fracassi, 41
20010 Bareggio (MI)
Italy

Product: LIFETEK PMS and LIFETEK 100 PMS

Components: PM₁₀ & PM_{2.5}

Test Report: 936/21224744/A of 2016-12-01

Valid until: 2021-11-30

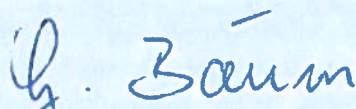
The LIFETEK PMS and LIFETEK 100 PMS
complies with the
European standard EN 12341:2014 (PM10 & PM2.5)
and can be used as a
Standard / Reference Low Volume Sampler




Tested AMS
Regular
Surveillance

www.tuv.com
ID 0000054060

Cologne, 2016-12-01


i.V. Dipl.-Ing. G. Baum


i.A. Dipl.-Chem. M. Kerpa

www.umwelt-tuv.de / www.eco-tuv.com
TRE@umwelt-tuv.eu
Tel. +49 - 221 - 806 - 5200

TÜV Rheinland Energy GmbH
Am Grauen Stein
51105 Köln

Test institute accredited to EN ISO/IEC 17025:2005 by DAkkS (German Accreditation Body).
This accreditation is limited to the accreditation scope defined in the enclosure to the certificate D-PL-11120-02-00.

CERTIFICATE

of Product Conformity (QAL1)

Certificate number: 0000051690

Certified AMS: AF 22e for SO₂

Manufacturer: Environnement S.A.,
111 bd, Robespierre
78304 Poissy Cedex
France

Test Institute: TÜV Rheinland Energy GmbH

This is to certify that the AMS has been tested and certified
according to the standards

VDI 4202-1 (2010), VDI 4203-3 (2010), EN 14212 (2012),
EN 15267-1 (2009), EN 15267-2 (2009) and EN 15267-3 (2008)

Certification is awarded in respect of the conditions stated in this certificate
(this certificate contains 9 pages).

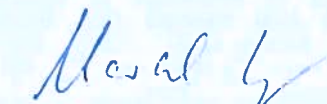


Suitability Tested
Complying with
2008/50/EC
EN 15267
Regular
Surveillance

www.tuv.com
ID 0000051690

Publication in the German Federal Gazette
(BAnz.) of 1 August 2016

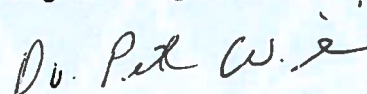
German Federal Environment Agency
Dessau, 19 August 2016



Dr. Marcel Langner
Head of Section II 4.1

This certificate will expire on:
31 July 2021

TÜV Rheinland Energy GmbH
Cologne, 18 August 2016



ppa. Dr. Peter Wilbring

www.umwelt-tuv.eu
tre@umwelt-tuv.eu
Tel. + 49 221 806-5200

TÜV Rheinland Energy GmbH
Am Grauen Stein
51105 Köln

Test institute accredited to EN ISO/IEC 17025:2005 by DAkkS (German Accreditation Body).
This accreditation is limited to the accreditation scope defined in the enclosure to the certificate D-PL-11120-02-00

Test report:	936/21228317/C of 18 December 2015
Initial certification:	1 August 2016
Expiry date:	31 July 2021
Publication:	BAnz AT 01.08.2016 B11, chapter III number 2.1

Approved application

The tested AMS is suitable for continuous ambient air monitoring of sulphur dioxide (stationary operation).

The suitability of the AMS for this application was assessed on the basis of a laboratory test and a three-month field test.

The AMS is approved for an ambient temperature range of 0 °C to +30 °C.

The notification of suitability of the AMS, performance testing, and the uncertainty calculation have been effected on the basis of the regulations valid at the time of performance testing. As changes in legal regulations are possible, any potential user should ensure that this AMS is suitable for monitoring the limit value relevant to the application.

Any potential user should ensure, in consultation with the manufacturer, that this AMS is suitable for the ambient air application at which it will be installed.

Basis of the certification

This certification is based on:

- Test report 936/21228317/C of 18 December 2015 of TÜV Rheinland Energie und Umwelt GmbH
- Suitability announced by the German Federal Environment Agency (UBA) as the relevant body
- The ongoing surveillance of the product and the manufacturing process

Publication in the German Federal Gazette: BAnz AT 01.08.2016 B11, chapter III number 2.1,
Announcement by UBA from 14 July 2016:

AMS designation:

AF 22e for SO₂

Manufacturer:

Environnement S.A., Poissy, France

Field of application:

The tested AMS is suitable for continuous ambient air monitoring
of sulphur dioxide (stationary operation).

Measuring ranges during the performance test:

Component	Certification range	Unit
Sulphur dioxide	0 - 1000	µg/m ³

Software version:

Firmware: 1.0.a

Restrictions:

None

Notes:

1. The performance test includes also the version AF 22e* (without integrated Display). In this case the measured values are displayed by means of a PC or Laptop which is part of the measuring system.
2. The report on the performance test is available online at www.gal1.de.

Test report:

TÜV Rheinland Energie und Umwelt GmbH, Cologne
Report No.: 936/21228317/C of 18 December 2015

Certified product

This certificate applies to automated measurement systems conforming to the following description:

The measuring principle of AF 22e is based on the principle of ultraviolet fluorescence.

Sampling is effected by means of a pump at the end of the circle through a Teflon tube located at the analyser's rear side. Dust protection is ensured by a Teflon filter.

The sample is first led through a Carbon Kicker, which eliminates aromatic hydrocarbons in the sample. The Carbon Kicker consists of two concentric tubes where the inner tube is made of a special polymer.

The sample contaminated with aromatic hydrocarbons is fed through the inner tube. Through permeation, the aromatic hydrocarbons reach the external tube rinsed with zero air. The sample, now free of hydrocarbons, is led to the reaction chamber where it is irradiated with ultraviolet light (centered to 214 nm). The wavelength of 214 nm corresponds to the absorption wavelength of the SO₂ molecules.

A photodiode measures the UV radiation coming from the UV light source. This measurement is taken in to account in order to even out potential fluctuations of the UV energy.

The molecules emit a specific fluorescence in UV light, which is optically filtered at the output between 300 and 400 nm. This fluorescence is visualized using the PM tube near the reaction chamber.

The AMS front side is fitted with the main switch as well as a TFT LCD colored display with backlight and a touch screen display. AF 22e for SO₂ is operated via the touch screen display. Version AF 22e* is identical to version AF 22e, expect for the fact that it is not fitted with a display. AF 22e* can only be operated via Ethernet using an external PC.

Fluid inputs and outputs as well as electrical connections are located on the rear side of the AMS.

General notes

This certificate is based upon the equipment tested. The manufacturer is responsible for ensuring that on-going production complies with the requirements of the EN 15267. The manufacturer is required to maintain an approved quality management system controlling the manufacture of the certified product. Both the product and the quality management systems shall be subject to regular surveillance.

If a product of the current production does not conform to the certified product, TÜV Rheinland Energy GmbH must be notified at the address given on page 1.

A certification mark with an ID-Number that is specific to the certified product is presented on page 1 of this certificate. This can be applied to the product or used in publicity material for the certified product.

This document as well as the certification mark remains property of TÜV Rheinland Energy GmbH. With revocation of the publication the certificate loses its validity. After the expiration of the certificate and on requests of the TÜV Rheinland Energy GmbH this document shall be returned and the certificate mark must not be employed anymore.

The relevant version of this certificate and its expiration is also accessible on the internet: gal1.de.

Certification of AF 22e is based on the documents listed below and the regular, continuous monitoring of the Quality Management System of the manufacturer:

Initial certification according to EN 15267

Certificate No. 0000051690: 19 August 2016
Expiry date of the certificate: 31 July 2021

Test report: 936/21228317/C of 18 December 2015
TÜV Rheinland Energie und Umwelt GmbH, Cologne,

Publication: BAnz AT 01.08.2016 B11, chapter III number 2.1
Announcement by UBA from 14 July 2016

Expanded uncertainty for laboratory, system 1

Measuring device:		AF 22e		Serial-No.:		SN 12	
Measured component:		SO2		1h-limit value:		132	
No.	Performance characteristic	Performance criterion	Result	Partial uncertainty	Square of partial uncertainty	nmol/mol	
1	Repeatability standard deviation at zero	≤ 1.0 nmol/mol	0,330	$u_{r,z}$	0,07	0,0051	
2	Repeatability standard deviation at 1h-limit value	≤ 3.0 nmol/mol	0,490	$u_{r,h}$	0,11	0,0116	
3	"lack of fit" at 1h-limit value	≤ 4.0% of measured value	0,920	$u_{l,h}$	0,70	0,4916	
4	Sensitivity coefficient of sample gas pressure at 1h-limit value	≤ 2.0 nmol/mol/kPa	0,270	u_{sp}	2,20	4,8260	
5	Sensitivity coefficient of sample gas temperature at 1h-limit value	≤ 1.0 nmol/mol/K	0,040	u_{gt}	0,32	0,1044	
6	Sensitivity coefficient of surrounding temperature at 1h-limit value	≤ 1.0 nmol/mol/K	0,316	u_{st}	2,57	6,6104	
7	Sensitivity coefficient of electrical voltage at 1h-limit value	≤ 0.30 nmol/mol/V	0,010	u_{lv}	0,09	0,0090	
8a	Interferent H ₂ O with 21 nmol/mol	≤ 10 nmol/mol (Zero)	0,490	u_{H_2O}	-2,60	6,7429	
8b	Interferent H ₂ S with 200 nmol/mol	≤ 10 nmol/mol (Span)	-3,480	$u_{int, pos}$			
8c	Interferent NH ₃ with 200 nmol/mol	≤ 5.0 nmol/mol (Zero)	-0,460				
8d	Interferent NO with 500 nmol/mol	≤ 5.0 nmol/mol (Span)	0,320				
8e	Interferent NO ₂ with 200 nmol/mol	≤ 5.0 nmol/mol (Zero)	0,140				
8f	Interferent m-Xylene with 1 µmol/mol	≤ 5.0 nmol/mol (Span)	-0,590				
9	Averaging effect	≤ 5.0 nmol/mol (Zero)	0,070				
10	Difference sample/calibration port	≤ 5.0 nmol/mol (Span)	0,070				
11	Uncertainty of test gas	≤ 5.0 nmol/mol (Zero)	0,110				
12		≤ 5.0 nmol/mol (Span)	0,370				
13		≤ 5.0 nmol/mol (Span)	0,600				
14		≤ 10 nmol/mol (Span)	1,570				
15		≤ 7.0% of measured value	3,270	$u_{int, neg}$			
16		≤ 1.0%	5,090	u_{sv}	3,88	15,0474	
17		≤ 3.0%	-0,330	u_{acc}	-0,44	0,1897	
18			2,000	u_{sg}	1,32	1,7424	
19		Combined standard uncertainty		u_c		6,4523	
20		Expanded uncertainty		U		12,9047	
21		Relative expanded uncertainty		W		9,78	
22		Maximum allowed expanded uncertainty		W_{req}		15	

Expanded uncertainty for laboratory, system 2

Measuring device:		AF 22e		Serial-No.:		SN 14	
Measured component:		SO2		1h-limit value:		132	
No.	Performance characteristic	Performance criterion	Result	Partial uncertainty	Square of partial uncertainty	nmol/mol	
1	Repeatability standard deviation at zero	≤ 1.0 nmol/mol	0,340	u _{r,z}	0,08	0,0058	
2	Repeatability standard deviation at 1h-limit value	≤ 3.0 nmol/mol	0,480	u _{r,h}	0,11	0,0119	
3	"lack of fit" at 1h-limit value	≤ 4.0% of measured value	0,960	u _{l,h}	0,73	0,5353	
4	Sensitivity coefficient of sample gas pressure at 1h-limit value	≤ 2.0 nmol/mol/kPa	0,410	u _{pp}	3,34	11,1282	
5	Sensitivity coefficient of sample gas temperature at 1h-limit value	≤ 1.0 nmol/mol/K	0,010	u _{gt}	0,08	0,0065	
6	Sensitivity coefficient of surrounding temperature at 1h-limit value	≤ 1.0 nmol/mol/K	0,099	u _{st}	0,81	0,6488	
7	Sensitivity coefficient of electrical voltage at 1h-limit value	≤ 0.30 nmol/mol/V	0,010	u _v	0,09	0,0090	
8a	Interferent H ₂ O with 21 mmol/mol	≤ 10 nmol/mol (Zero) ≤ 10 nmol/mol (Span)	-1,100 -2,920	u _{H2O}	-2,18	4,7474	
8b	Interferent H ₂ S with 200 nmol/mol	≤ 5.0 nmol/mol (Zero) ≤ 5.0 nmol/mol (Span)	-0,630 1,570	u _{H2S}			
8c	Interferent NH ₃ with 200 nmol/mol	≤ 5.0 nmol/mol (Zero) ≤ 5.0 nmol/mol (Span)	0,110 -1,600				
8d	Interferent NO with 500 nmol/mol	≤ 5.0 nmol/mol (Zero) ≤ 5.0 nmol/mol (Span)	-1,640 0,220				
8e	Interferent NO ₂ with 200 nmol/mol	≤ 5.0 nmol/mol (Zero) ≤ 5.0 nmol/mol (Span)	0,390 0,870				
8f	Interferent m-Xylene with 1 µmol/mol	≤ 10 nmol/mol (Zero) ≤ 10 nmol/mol (Span)	3,160 3,160	u _{m,x}			
9	Averaging effect	≤ 7.0% of measured value	5,250	u _{av}	4,00	16,0083	
18	Difference sample/calibration port	≤ 1.0%	0,060	u _{asc}	0,08	0,0063	
21	Uncertainty of test gas	≤ 3.0%	2,000	u _{tg}	1,32	1,7424	
Combined standard uncertainty						u _c	6,7308
Expanded uncertainty						U	13,4615
Relative expanded uncertainty						W	10,20
Maximum allowed expanded uncertainty						W _{req}	15

Combined standard uncertainty for laboratory and field, system 1

Measuring device: AF 22a		Serial-No.: SN 12		1h-limit value:		Square of partial uncertainty		nmol/mol	
Measured component: SO2		1h-limit value:		Square of partial uncertainty		Square of partial uncertainty		nmol/mol	
No.	Performance characteristic	Performance criterion	Result	Partial uncertainty	Partial uncertainty	Partial uncertainty	Partial uncertainty	Partial uncertainty	Partial uncertainty
1	Repeatability standard deviation at zero	≤ 1.0 nmol/mol	0.330	$u_{r,z}$	0.07	0.0051			
2	Repeatability standard deviation at 1h-limit value	≤ 3.0 nmol/mol	0.490	$u_{r,h}$	not considered, as $u_{r,h} = 0.1 < u_{r,f}$				
3	"lack of fit" at 1h-limit value	≤ 4.0% of measured value	0.920	$u_{l,h}$	0.70	0.4916			
4	Sensitivity coefficient of sample gas pressure at 1h-limit value	≤ 2.0 nmol/mol/KPa	0.270	u_{sp}	2.20	4.8260			
5	Sensitivity coefficient of sample gas temperature at 1h-limit value	≤ 1.0 nmol/mol/K	0.040	u_{t}	0.32	0.1044			
6	Sensitivity coefficient of surrounding temperature at 1h-limit value	≤ 1.0 nmol/mol/K	0.316	u_{st}	2.57	6.6104			
7	Sensitivity coefficient of electrical voltage at 1h-limit value	≤ 0.30 nmol/mol/V	0.010	u_{v}	0.09	0.0090			
8a	Interferent H ₂ O with 21 nmol/mol	≤ 10 nmol/mol (Zero)	0.490						
8b	Interferent H ₂ S with 200 nmol/mol	≤ 10 nmol/mol (Span)	-3.480	u_{h2o}	-2.60	6.7429			
8c	Interferent NH ₃ with 200 nmol/mol	≤ 5.0 nmol/mol (Zero)	-0.460						
8d	Interferent NO with 500 nmol/mol	≤ 5.0 nmol/mol (Span)	0.320	$u_{int,poa}$					
8e	Interferent NO ₂ with 200 nmol/mol	≤ 5.0 nmol/mol (Zero)	0.140						
8f	Interferent m-Xylene with 1 µmol/mol	≤ 5.0 nmol/mol (Span)	-0.590						
9	Averaging effect	≤ 7.0% of measured value	0.070						
10	Reproducibility standard deviation under field conditions	≤ 5.0% of average over 3 months	-0.110						
11	Long term drift at zero level	≤ 5.0 nmol/mol (Zero)	0.370						
12	Long term drift at span level	≤ 5.0 nmol/mol (Span)	0.600						
18	Difference sample/calibration port	≤ 10 nmol/mol (Zero)	1.570						
21	Uncertainty of test gas	≤ 10 nmol/mol (Span)	3.270	$u_{int,avg}$	2.42	5.8520			
			5.090	u_{av}	3.88	15.0474			
			1.240	$u_{r,i}$	1.64	2.6791			
			0.630	$u_{d,i,z}$	0.38	0.1323			
			0.750	$u_{d,i,h}$	0.57	0.3267			
			-0.330	$u_{i,sc}$	-0.44	0.1897			
			2.000	u_{sp}	1.32	1.7424			
Combined standard uncertainty				u_c		6.6902			nmol/mol
Expanded uncertainty				U		13.3805			nmol/mol
Relative expanded uncertainty				W		10.14			%
Maximum allowed expanded uncertainty				W_{req}		15			%

Combined standard uncertainty for laboratory and field, system 2

Measuring device: AF 22b		Serial-No.: SN 14		1h-limit value:		Square of partial uncertainty		nmol/mol	
Measured component: SO2		1h-limit value:		Square of partial uncertainty		nmol/mol		%	
No.	Performance characteristic	Performance criterion	Result	Partial uncertainty	1h-limit value:	Partial uncertainty	Result	Partial uncertainty	1h-limit value:
1	Repeatability standard deviation at zero	≤ 1.0 nmol/mol	0.340	$u_{r,z}$	0.08	$u_{r,z}$	0.340	$u_{r,z}$	0.08
2	Repeatability standard deviation at 1h-limit value	≤ 3.0 nmol/mol	0.480	$u_{r,h}$	not considered, as $u_{r,h} = 0,1 < u_{r,f}$	$u_{r,h}$	0.480	$u_{r,h}$	-
3	"lack of fit" at 1h-limit value	≤ 4.0% of measured value	0.960	$u_{l,h}$	0.73	$u_{l,h}$	0.960	$u_{l,h}$	0.5353
4	Sensitivity coefficient of sample gas pressure at 1h-limit value	≤ 2.0 nmol/mol/kPa	0.410	u_{sp}	3.34	u_{sp}	0.410	u_{sp}	11,1282
5	Sensitivity coefficient of sample gas temperature at 1h-limit value	≤ 1.0 nmol/mol/K	0.010	u_{pt}	0.08	u_{pt}	0.010	u_{pt}	0,0065
6	Sensitivity coefficient of surrounding temperature at 1h-limit value	≤ 1.0 nmol/mol/K	0.099	u_{st}	0.81	u_{st}	0.099	u_{st}	0,6488
7	Sensitivity coefficient of electrical voltage at 1h-limit value	≤ 0.30 nmol/mol/V	0.010	u_{v}	0.09	u_{v}	0.010	u_{v}	0,0090
8a	Interferent H ₂ O with 21 nmol/mol	≤ 10 nmol/mol (Zero)	-1,100	u_{H_2O}	-2,18	u_{H_2O}	-1,100	u_{H_2O}	4,7474
8b	Interferent H ₂ S with 200 nmol/mol	≤ 10 nmol/mol (Zero)	-2,920	u_{H_2S}		u_{H_2S}	-2,920	u_{H_2S}	
8c	Interferent NH ₃ with 200 nmol/mol	≤ 5.0 nmol/mol (Span)	1,570	$u_{NH_3, pos}$		$u_{NH_3, pos}$	1,570	$u_{NH_3, pos}$	
8d	Interferent NO with 500 nmol/mol	≤ 5.0 nmol/mol (Zero)	0,110				0,110		
8e	Interferent NO ₂ with 200 nmol/mol	≤ 5.0 nmol/mol (Span)	-1,600				-1,600		
8f	Interferent m-Xylene with 1 µmol/mol	≤ 5.0 nmol/mol (Zero)	0,220				0,220		
9	Averaging effect	≤ 5.0 nmol/mol (Span)	-1,840				-1,840		
10	Reproducibility standard deviation under field conditions	≤ 5.0 nmol/mol (Zero)	0,390				0,390		
11	Long term drift at zero level	≤ 5.0 nmol/mol (Span)	0,870				0,870		
12	Long term drift at span level	≤ 5.0 nmol/mol (Zero)	0,740				0,740		
18	Difference sample/calibration port	≤ 10 nmol/mol (Span)	3,160	$u_{diff, neg}$	4,00	$u_{diff, neg}$	3,160	$u_{diff, neg}$	16,0083
21	Uncertainty of test gas	≤ 7.0% of measured value	5,250	u_{tw}	1,84	u_{tw}	5,250	u_{tw}	2,6791
		≤ 5.0% of average over 3 months	1,240	$u_{r,f}$	0,43	$u_{r,f}$	1,240	$u_{r,f}$	0,1825
		≤ 5.0% of max. of certification range	-0,570	$u_{d,z}$	-0,43	$u_{d,z}$	-0,570	$u_{d,z}$	0,1887
		≤ 1.0%	0,060	u_{fac}	0,08	u_{fac}	0,060	u_{fac}	0,0063
		≤ 3.0%	2,000	u_{cg}	1,32	u_{cg}	2,000	u_{cg}	1,7424
		Combined standard uncertainty	u_c				u_c		6,9528
		Expanded uncertainty	U				U		13,9056
		Relative expanded uncertainty	W				W		10,53
		Maximum allowed expanded uncertainty	W_{res}				W_{res}		15

AUSILIO S.P.A.			MODULO														MOD. 09	Rev 00																														
			CONTROLLI, MANUTENZIONE E TARATURE														Data 09/11/2015																															
CENTRALINA: Mezzo Mobile			ID STRUMENTO: campionatore di particolato PM10																																													
MARCA: TCR TECORA			MODELLO: FOX + SENTINEL							N. SERIE: 340/115																																						
ANNO DI RIFERIMENTO: 2018			DATA INTERVENTO:																																													
ELEMENTO CONTROLLATO	FREQUENZA CONTROLLO (GG)	CRITERIO ACCETTAZIONE	11/05/2018	14/05/2018	15/06/2018	26/07/2018	22/08/2018	26/09/2018	12/10/2018	31/10/2018	16/11/2018	17/12/2018	24/01/2019	07/02/2019	21/03/2019	05/04/2019	23/04/2019	07/05/2019																														
TIPOLOGIA INTERVENTO		O/ ST/E/I/M/T/C	T	I	O	I	O/I	I	I	I	O/I	O	I	O/I	I	I	I	O/I																														
DATA/ORA SISTEMA	15*	DATA/ORA ESATTA	C-OK	C-OK		C-OK	C-OK	C-OK	C-OK	C-OK	C-OK		C-OK	C-OK	C-OK	C-OK	C-OK	C-OK																														
PULIZIA INVOLUCRO ESTERNO	15*	COLLEGAMENTO CORRETTO	C-OK	C-OK		C-OK	C-OK	C-OK	C-OK	C-OK	C-OK		C-OK	C-OK	C-OK	C-OK	C-OK	C-OK																														
PULIZIA TESTA E LINEA DI PRELIEVO	15*	CONTROLLO VISIVO	C-OK	C-OK		C-OK	C-OK	C-OK	C-OK	C-OK	C-OK		C-OK	C-OK	C-OK	C-OK	C-OK	C-OK																														
SOSTITUZIONE ELEMENTI CONSUMABILI MOTORE	6000H-240GG	CONTROLLO VISIVO	S																																													
SOSTITUZIONE FILTRO INTERNO DI PROTEZIONE CONTATORE	6000H-240GG	RISPETTO TEMPISTICA	S																																													
CONTROLLO DISPOSITIVO MOVIMENTAZIONE FILTRI	6000H-240GG	RISPETTO TEMPISTICA	C-OK																																													
CONTROLLO STATO USURA O-RING TENUTA LINEA ASPIRAZIONE	6000H-240GG	RISPETTO TEMPISTICA	C-OK																																													
TEST TENUTA PNEUMATICA	6000H-240GG	RISPETTO TEMPISTICA	C-OK																																													
SOSTITUZIONE FILTRI ANTIPOLVERE	6000H-240GG	RISPETTO TEMPISTICA	C-OK																																													
PARAMETRI DI FUNZIONAMENTO	15*	RISPETTO TEMPISTICA	C-OK	C-OK		C-OK	C-OK	C-OK	C-OK	C-OK	C-OK		C-OK	C-OK	C-OK	C-OK	C-OK	C-OK																														
ANNO DI RIFERIMENTO: 2018			DATA TARATURA:																																													
STRUMENTO DOTATO DI IZS		NO	11/05/2018	14/05/2018	15/06/2018	26/07/2018	22/08/2018	26/09/2018	12/10/2018	31/10/2018	16/11/2018	17/12/2018	24/01/2019	07/02/2019	21/03/2019	05/04/2019	23/04/2019	07/05/2019																														
CONTROLLO FLUSSO	30	2% VALORE DI RIFERIMENTO	C-OK		C-OK	C-OK	C-OK	C-OK	C-OK	C-OK	C-OK	C-OK	C-OK	C-OK	C-OK	C-OK		C-OK																														
TARATURA FLUSSO	90	35,5-40,3 l/min PM10/2,5 15-23 l/min PTS	T				T				T			T				T																														
TARATURA SENSORI PRESSIONE	90	± 0,5 kPa	T				T				T			T				T																														
TARATURA SENSORI TEMPERATURA	90	± 1°C	T				T				T			T				T																														
TECNICO			Orion	AS+LC	AS	AS+LC	LC	LC	AS+FP	AS+LC	LC	LC	LC	LC	LC	LC	LC	FP																														
LEGENDA	TIPO DI INTERVENTO		ESITO INTERVENTO														NOTE:																															
	I	INSTALLAZIONE	C-OK: CHECK SUPERATO																																													
C	CONTROLLO	NC-OK: CHECK NON SUPERATO																																														
M	MANUTENZIONE	S: SOSTITUZIONE																																														
O	ORDINARIA	NE:CHECK NON ESEGUIBILE																																														
ST	STRAORDINARIA	15*: DA EFFETTUARSI SOLO NEL CASO DI CAMPAGNE DI DURATA SUPERIORE A 15 GIORNI																																														
T	TARATURA																																															
E	EMERGENZA																																															
		Conc. Bombola (ppb)																																														

AUSILIO S.P.A.			MODULO														MOD. 09	Rev 00																	
			CONTROLLI, MANUTENZIONE E TARATURE														Data 09/11/2015																		
CENTRALINA: Mezzo Mobile			ID STRUMENTO: campionatore di particolato PM2.5																																
MARCA: TCR TECORA			MODELLO: CHARLIE HV + SENTINEL				N. SERIE: 340/115																												
ANNO DI RIFERIMENTO: 2018			DATA INTERVENTO:																																
ELEMENTO CONTROLLATO	FREQUENZA CONTROLLO (GG)	CRITERIO ACCETTAZIONE	11/05/2018	14/05/2018	15/06/2018	26/07/2018	22/08/2018	26/09/2018	12/10/2018	31/10/2018	16/11/2018	17/12/2018	24/01/2019	07/02/2019	21/03/2019	05/04/2019	23/04/2019	07/05/2019																	
TIPOLOGIA INTERVENTO		O/ ST/E/I/M/T/C	T	I	O	I	O/I	I	I	I	O/I	O	I	O/I	I	I	I	O/I																	
DATA/ORA SISTEMA	15*	DATA/ORA ESATTA	C-OK	C-OK		C-OK	C-OK	C-OK	C-OK	C-OK	C-OK		C-OK	C-OK	C-OK	C-OK	C-OK	C-OK																	
PULIZIA INVOLUCRO ESTERNO	15*	COLLEGAMENTO CORRETTO	C-OK	C-OK		C-OK	C-OK	C-OK	C-OK	C-OK	C-OK		C-OK	C-OK	C-OK	C-OK	C-OK	C-OK																	
PULIZIA TESTA E LINEA DI PRELIEVO	15*	CONTROLLO VISIVO	C-OK	C-OK		C-OK	C-OK	C-OK	C-OK	C-OK	C-OK		C-OK	C-OK	C-OK	C-OK	C-OK	C-OK																	
SOSTITUZIONE ELEMENTI CONSUMABILI MOTORE	6000H-240GG	CONTROLLO VISIVO	S																																
SOSTITUZIONE FILTRO INTERNO DI PROTEZIONE CONTATORE	6000H-240GG	RISPETTO TEMPSTICA	S																																
CONTROLLO DISPOSITIVO MOVIMENTAZIONE FILTRI	6000H-240GG	RISPETTO TEMPSTICA	C-OK																																
CONTROLLO STATO USURA O-RING TENUTA LINEA ASPIRAZIONE	6000H-240GG	RISPETTO TEMPSTICA	C-OK																																
TEST TENUTA PNEUMATICA	6000H-240GG	RISPETTO TEMPSTICA	C-OK																																
SOSTITUZIONE FILTRI ANTIPOLVERE	6000H-240GG	RISPETTO TEMPSTICA	C-OK																																
PARAMETRI DI FUNZIONAMENTO	15*	RISPETTO TEMPSTICA	C-OK	C-OK		C-OK	C-OK	C-OK	C-OK	C-OK	C-OK		C-OK	C-OK	C-OK	C-OK	C-OK	C-OK																	
ANNO DI RIFERIMENTO: 2018			DATA TARATURA:																																
STRUMENTO DOTATO DI IZS	NO		11/05/2018	14/05/2018	15/06/2018	26/07/2018	22/08/2018	26/09/2018	12/10/2018	31/10/2018	16/11/2018	17/12/2018	24/01/2019	07/02/2019	21/03/2019	05/04/2019	23/04/2019	07/05/2019																	
CONTROLLO FLUSSO	30	2% VALORE DI RIFERIMENTO	C-OK		C-OK	C-OK	C-OK	C-OK	C-OK	C-OK	C-OK	C-OK	C-OK	C-OK	C-OK	C-OK		C-OK																	
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TARATURA SENSORI TEMPERATURA	90	± 1°C	T					T			T			T				T																	
TECNICO			Orion	AS+LC	AS	AS+LC	LC	LC	AS+FP	AS+LC	LC	LC	LC	LC	LC	LC	LC	FP																	
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